

REMARKS

Applicant appreciates the Examiner's review of the present application. Claims 1-17 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,674,046 to Ozeki et al. (the Ozeki patent) in view of U.S. Patent No. 5,946,370 to Adler et al. (the Adler patent). Applicant has amended the specification to correct typographical errors and numerical designations. Applicant has not amended any of Claims 1-17. In response to the Office Action and as explained in more detail below, Applicant respectfully submits that neither of the Ozeki or Adler patents, individually or in combination, teach or suggest the claimed invention and that the claimed invention is not obvious in light of these references. As such, the Applicant respectfully traverses the rejections of the claims under § 103(a). In light of the remarks presented below, the Applicant respectfully requests reconsideration and allowance of all the claims of the present invention.

The Ozeki patent discloses a method and apparatus for obtaining three-dimensional tomographic images by interpolation of a plurality of parallel-localizer images. The three-dimensional representation object image is then used to allow the operator to define additional representative scan planes in the object image.

The Adler patent discloses a geometric modeling program for obtaining three-dimensional representations of objects. The process involves combining and interpolating localizer images and additional scan images to approximate a three-dimensional wire-frame model of the subject. The model is intended to analyze the physical condition of a person suffering from idiopathic scoliosis and is used for subsequent intermediate examinations where fewer scans are performed from which a geometric model of the spine cannot be formed but where the scans can be inserted into the geometric boundaries provided by the previously formed model.

The Applicant first respectfully contends that there is no support in the Office Action to combine the cited references. Applicant submits that the references cannot properly be combined to support the obviousness rejection. In order to properly combine references, a

teaching or motivation to combine the references is essential. *In re Fine*, 837 F.2d 1071, 1075 (Fed. Cir. 1988). In fact, the Court of Appeals for the Federal Circuit has stated that "[c]ombining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure of a blueprint for piecing together the prior art to defeat patentability -- the essence of hindsight." *In Re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). Although the evidence of a suggestion, teaching or motivation to combine the references commonly comes from the prior art references themselves, the suggestion, teaching or motivation can come from the knowledge of one of ordinary skill in the art or the nature of the problem to be solved. *Id.* In any event, the showing must be clear and particular and "[b]road conclusory statements regarding the teaching effort of multiple references, standing alone, are not 'evidence'." *Id.*

In the present application, no motivation or suggestion is provided for combining the references. The Ozeki patent is an object rendering method; the Adler patent is a wire frame approximation process. These two patents do not perform similar tasks and are not directed to solving the same problem, thus one of ordinary skill in the art would not combine the references or modify one in view of the other. Adler is completely unrelated to the claimed invention or the general process of defining proper scan acquisition plane orientations for depiction of desired anatomical landmarks and structures of interest. Nothing in the Ozeki patent suggests that it might be used for reconstructing wire frame approximations as described by the Adler patent. Likewise, the Adler patent does not reference or discuss scan plane orientation as described by the Ozeki patent. Based upon the above remarks, it would not have been obvious at the time the claimed invention was made to one of ordinary skill in the art to combine the teachings of the Ozeki and Adler patents. Thus, the Ozeki and Adler patents cannot properly be combined in support of an obviousness rejection of the claims. Applicant therefore submits that the rejection of Claims 1-17 under 35 U.S.C. § 103(a) is overcome since the cited references cannot properly be combined.

Alternatively, even if the Examiner disagrees with the Applicant's contention that there is no support to combine the references, the Ozeki and Adler patents do not disclose each of the elements of the claimed invention. As recited by Claim 1, representative of Claims 8 and 14, a

3-D model device generates a 3-D model. The Ozeki patent does not, as stated in the Office Action, generate a 3-D model as in the claimed invention, but renders by interpolation a three-dimensional object image. An object image of the Ozeki patent is strikingly different from a 3-D model of the claimed invention. An object image of the Ozeki patent is a three-dimensional rendering of the object being scanned, rather than a display of the actual scan images. Using interpolation, the Ozeki patent forms an object image by augmenting insufficient landmark information of the scan images by providing overlay graphics to depict intersections of tomographic image slice locations. Because the method disclosed in Ozeki relies upon interpolation, an object image of the Ozeki patent has degraded resolution. *See* Ozeki, col. 2, ll. 27-29.

As described by the specification, a 3-D model of the claimed invention is a display of planar scan images. *See generally* pp. 4, 5, and 13. Interpolation is not required to generate a 3-D model of the claimed invention because a separate image is not rendered, thus the resolution of the images is not degraded. Accordingly, the interpolation method of the Ozeki patent teaches away from a 3-D model of the claimed invention. The only modification to the planar scan images may be texture mapping to show the dynamics of the anatomy as described in the application. *See* p. 4, ll. 26-30; p. 13, ll. 17-20. This modification, however, does not alter the fundamental difference between the object image of the Ozeki patent and the 3-D model of the claimed invention. The specification describes that the 3-D model of the claimed invention uses readily available information of the planar scan images and the image intensity values to provide visualization of references to anatomical landmarks, information not available in the method of the Ozeki patent. *See generally* pp. 4, 11, 13, 16, and 21-22. For this reason the functionality of the two methods is necessarily distinct. Additionally, an object image and a slice position image of the Ozeki patent are substantially different from a 3-D model and a scan model of the claimed invention. While similar subject matter is involved and similar language is used, these terms have significantly different meanings and applications. Three-dimensional object images of the Ozeki patent are interpolated to include extractions of two-dimensional scan images representing the object extent and shape of the object being imaged. The 3-D model and scan model of the claimed invention are planar images of data shown in perspective three-dimensional volume, not

representative delineations of scan data. Furthermore, a 3-D model device, not an imaging device, generates the 3-D model in the claimed invention, and the Office Action states that the Ozeki patent “does not disclose a 3-D model device.” P. 3, ll. 16-17. Thus, Ozeki could not disclose a 3-D model device for generating a 3-D model as claimed in the application.

Also recited by Claim 1 is an operator defined plane. The Applicant asserts that the Office Action has incorrectly applied the meaning of “an operator defined plane,” “changing a viewpoint of the object image,” and “an image slice.” The Office Action states that “changing a viewpoint of the object image as defining an image plane, such image slice designated by the coordinate information input device corresponds to the claimed ‘operator defined plane.’” Pp. 1-2. This interpretation in the Office Action fails to distinguish between a view of the displayed image and a user defined scan plane. The Applicant represents that changing the viewpoint of the object image does not define an image slice or an operator defined plane. Changing the viewpoint of the object image is equivalent to changing the virtual camera position described in the present application, not defining an image slice or an operator defined plane for subsequent acquisition. *See* p. 5, ll. 1-3; p. 15, l. 8, ll. 11-12. Additionally, an image slice is not the same as an operator defined plane. An image slice of the Ozeki patent is a cross-section of the rendered object image. An operator defined plane is a proposed, subsequent scan plane oriented and displayed relative to existing planar scan images. Thus, the Ozeki patent does not disclose an operator defined plane as described and claimed in the application.

The Applicant agrees with the Office Action that “Ozeki does not disclose a 3-D model device.” P. 3, ll. 16-17. However, the Applicant asserts that the geometric modeling program of the Adler patent does not disclose a 3-D model device as described and claimed in the present invention. The geometric modeling program of the Adler patent constructs a wire-frame model of vertebrae by combining two-dimensional scout images with three-dimensional simple vertebrae modeling. The geometric modeling program of the Adler patent involves approximation of existing data to compute the constructed model. As described in the specification, the 3-D model device of the claimed invention generates a 3-D model by mapping the existing planar scan image data into three-dimensions; a 3-D model device displays existing

scan data and does not approximate existing forms or construct a model that only represents the data as best as it can fit an expected spinal column.

Additionally, the geometric modeling program of the Adler patent is not equivalent to the linear interpolation performed in the Ozeki patent. The interpolation of the geometric modeling program is designed to locate extremity points within a single scan image and then interpolate an intersecting curve to create a wire-frame spine. Once the geometric modeling program of the Adler patent has created a constructed model, linear interpolation is used to process a new scan image onto the already constructed model. The Ozeki patent interpolates the data of parallel scan images to generate an object image by augmenting insufficient landmark information of the scan images by providing overlay graphics to depict intersections of tomographic image slice locations. The geometric modeling program of the Adler patent is different from and not required for the interpolation process of the Ozeki patent. Thus, one of ordinary skill in the art would not have modified the Ozeki patent to include a geometric modeling program of the Adler patent. Alternatively, even if the Examiner disagrees with this assertion, the geometric modeling program of the Adler patent does not disclose a 3-D model device of the claimed invention as previously discussed. As such, Applicant submits that independent Claims 1, 8, and 14, as well as dependent Claims 2-7, 9-13, and 15-17 that respectively depend therefrom, are patentably distinct from the cited references, even if the cited references were combined. Thus, the rejection of Claims 1-17 under 35 U.S.C. § 103(a) is therefore overcome for this additional reason.

As recited by Claim 3, representative of Claims 10 and 15, the 3-D model device updates the 3-D model. Because the Ozeki patent "does not disclose a 3-D model device" as stated in the Office Action (p. 3, ll. 16-17), the Applicant does not understand how the Ozeki patent could disclose updating of the 3-D model by the 3-D model device to include the acquired operator defined plane. If the Ozeki patent does not disclose a 3-D model device, as stated in the Office Action, and does not disclose a 3-D model or operator defined plane, as previously discussed, the Ozeki patent cannot disclose wherein the 3-D model device updates the 3-D model to include the acquired operator defined plane. As such, Applicant further submits that dependent Claims 3, 10 and 15, as well as dependent Claims 4, 11, and 16 that respectively depends therefrom, are also

patentably distinct from the cited references, even if the cited references were combined. Thus, the rejection of Claims 3, 4, 10, 11, 15, and 16 under 35 U.S.C. § 103(a) is therefore overcome for this additional reason.

As recited by Claim 5, the 3-D model device includes a scan model, for receiving the scan geometry parameters, and a subject model, for receiving image data from the imaging device. The Applicant asserts that the statement in the Office Action that “Adler discloses a constructed model 180” is insufficient support that the Adler patent discloses that a 3-D model device includes a scan model, for receiving the scan geometry parameters, and a subject model, for receiving image data from the imaging device, as in Claim 5. Furthermore, the Applicant contends that the Adler patent does not disclose a scan model, for receiving the scan geometry parameters, and a subject model, for receiving image data from the imaging device. The Adler patent discloses a constructed model. This model is a combination of localizer images, scout images, and acquired scan images. The Adler constructed model does not receive scan geometry parameters as it does not, and cannot, exist until after the additional scan imagery has already been acquired. A constructed model of the Adler patent is not used by the operator to define and acquire additional scan images but is formed by a combination of image data and interpolation. The constructed model of the Adler patent is not a continuously interactive 3-D model that accepts scan geometry and image data capable of updating the subject model to include additional image data. Thus, the Adler patent does not disclose that a 3-D model device includes a scan model and a subject model as described and claimed in the present application. As such, Applicant further submits that dependent Claim 5 is also patentably distinct from the cited references, even if the cited references were combined. Thus, the rejection of Claim 5 under 35 U.S.C. § 103(a) is therefore overcome for this additional reason.

In view of the remarks presented above, it is respectfully submitted that the present claims are in condition for immediate allowance. It is therefore respectfully requested that a Notice of Allowance be issued. The Examiner is encouraged to contact Applicant's undersigned attorney to resolve any remaining issues in order to expedite examination of the present invention.

In re: Marijn E. Brummer
Appl. No.: 09/576,113
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It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefore (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

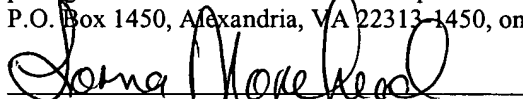


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